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A SEARCH FOR THE H PARTICLE (BNL EXPTS. E813/836)

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The goal of this experiment is to search for a strangeness=−2 dibaryon called the H particle. This state was predicted by Jaffe to have a mass 80 MeV less than the $\Lambda\Lambda$ mass of 2232 MeV.[1] The experimental observation of this state would provide much needed data to help understand the confinement mechanism of quarks. The apparatus and experimental technique were presented in a previous progress report and will not be repeated here.

The IUCF contribution to this project is the second-level trigger system. The second-level trigger is designed to fast clear events before they are read into the main data acquisition computers. The events we wish to fast clear are background events such as $K^- + p \to K^- + p$ and $K^- + p \to K\pi p$, where the proton is detected in the K^+ magnetic spectrometer. We are using time-of-flight to differentiate protons from kaons.

The experiment was setup and debugged and took data in spring, 1991. During this run and subsequent analysis, we have now verified that all major detector systems are working. Analysis codes are being developed for the in-beam (kaon) detectors, silicon

detectors and neutron detectors. We have a sample of $K^- + p \rightarrow K^+ + \Xi^-$ events, which allow us to further develop the identification techniques for these events. We have verified that, indeed, protons are the dominant positively-charged particles in our K^+ spectrometer. This means the second-level trigger is very important, and will be used in the 1992 run. Several additional cuts have been devised for this trigger, based on experience gained from the 1991 data. One example is a cut that accepts only large angles when the particle passed through the beam-irradiated region of the first portion of the K^+ spectrometer. This cut preserves kaon efficiency without increasing the number of beam particles in the trigger.

The H-particle search is using a new 2 GeV/c beamline at the BNL AGS. This beamline clearly can be used for other experiments. The E-813/836 collaboration has submitted a proposal to observe the formation of ^{6}He hypernuclei. There is the possibility of doing weak decay measurements on double-Λ hypernuclei. Other experiments are also being explored for the H search apparatus. In addition, during the heavy ion running at the AGS in spring, 1992, the E-886 collaboration did an experiment to study the suitability of the H-search apparatus for searches for strangelets (nuclei with large strangeness quantum number, and very small charge-to-mass ratio).

E-813 will take data during May-July 1992. With approval from the AGS program advisory committee, data taking will continue during 1993 as well.

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MEGA: A SEARCH FOR THE DECAY $\mu^+ \rightarrow e^+\gamma$

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The IUCF contribution to the MEGA experiment (LAMPF experiment 969)[1] consists of major portions of the first- and second-level trigger systems, and responsibility for integrating the parts of the trigger system into the overall experiment. The detector and trigger systems were described in a previous annual report, and this description will not be repeated here. The specific IUCF hardware responsibilities are: the design, fabrication and testing of the routing box and the the design, fabrication, and testing of the trigger fan out/busy (TF/B) modules.

We have finished the remaining two types of TF/B modules needed for the complete MEGA trigger system. Four of the pTF/B (photon TF/B) modules are complete and one unit of the eoTF/B (even/odd electron scintillator TF/B) is complete. These modules are now installed in the MEGA experiment, and no more are needed to accommodate the third and final photon spectrometer, which will be installed in early 1993.